

Diagnosing in neurology

Throughout the exam, think is the pathology:

-Unilateral or bilateral?

-UMN or LMN?

-Weakness: proximal, distal or pyramidal?

-Sensory loss: glove and stocking, sensory level, dermatomal or peripheral nerve?

By the time you get to the sensory exam you should know what you are expecting to find and use it to confirm and/or narrow down differentials.

See the [neurology differentials](#) page.

Introduction

- Wash hands, introduce self, patient's name & DOB & what they like to be called, explain examination and get consent
- Expose patient's upper body (leave bra on)

Inspection

- **General inspection**
 - **Patient:** patient well, posture, habitus, other signs of neurological conditions (e.g. hypomimia, facial muscle wasting)
 - **Around bed:** walking aids, orthoses
- **Local inspection**
 - **Tremors**
 - **Muscles:** muscle wasting – in general and look closely for thenar/hypothenar wasting and for dorsal hand guttering (LMN lesion), fasciculations (LMN lesion)
 - **Skin:** neurofibromas, café au lait spots, scars (including small muscle biopsy scars)

Tone

- **Pronator drift:** ask patient to hold arms out fully extended with palms facing upwards and close their eyes (pronator drift and distal flexion = pyramidal weakness; upward drift = cerebellar lesion). Upward cerebellar drift can be accentuated by 'rebound' – pushing patient's wrists down briskly and then quickly letting go.
- **Tone** (↑=UMN lesion, ↓=LMN lesion; cogwheel rigidity = Parkinson's tremor superimposed on increased tone)
 1. Elbow: hold the patient's hand as if you are shaking their hand, support their elbow with your other hand and repeatedly flex and extend their elbow to full range.
 2. Forearm: in the same position, with their elbow at 90° flexion, repeatedly pronate and supinate their hand in alternating directions
 3. Wrist: hold their forearm just proximal to their wrist and flex and extend then rotate their hand on their wrist

Power

Test one side at a time and always support the joint being tested with one hand (use as a lever). You must use all your strength!

MRC grades: 5 = full power, 4 = some resistance, 3 = GRAVITY, 2 = gravity eliminated, 1 = flicker of muscle contraction, 0 = nothing.

- **Shoulder abduction (C5):** Patient abduct shoulders and raise arms to horizontal plane. Now push them down.
"Don't let me push your arms down"
- **Elbow flexion (C6):** Patient bring arms into sagittal plane with elbows flexed. Hold ipsilateral elbow with one hand and try and pull wrist away.
"Hold your arms like this, as if you are boxing. Now I'm going to try and pull your wrist away, don't let me."
- **Elbow extension (C7):** In the same position, try and push their wrist towards them.
"Now I want you to try and push me away while I hold your wrist."
- **Wrist extension (C7):** Patient hold their arms out straight while making fists. Stabilise their ipsilateral wrist with one hand and use the posterior side of your fist to try and push theirs down.
"Hold your fists out like this. Now I'm going to try and push your fists downwards, don't let me."
- **Finger extension (C7):** Patient hold their arms out straight with their fingers extended. Stabilise their ipsilateral metacarpals with one hand and use the posterior side of your other hand's extended fingers to try and push theirs down.
"Hold your fingers straight out. Now I'm going to try and push your fingers downwards, don't let me."
- **Finger flexion (C8):** Interlock grips with the patient's and try to open their fingers.
"Grip my fingers and don't let me open your hand."
- **Finger abduction (T1):** Ask patient to spread their fingers. Try to push their little and index fingers inwards, using your spread fingers (with the same digits as the ones you are touching).
"Spread your fingers. Don't let me push them inwards."
- **Thumb abduction (T1):** Ask the patient to hold their palms facing up and point their thumbs into the air. Try to push their thumbs down into their palms.
"Don't let me push your thumbs down."

Reflexes

Hold the tendon hammer by the end of the plastic rod (not in the middle) to make a pendulum-type swing. If you cannot elicit a reflex, ensure the patient is fully relaxed, get them to close their eyes and grit their teeth when you strike the tendon.

Reflexes may be brisk, normal, reduced or absent.

- **Biceps (C5/6):** Ask patient to relax their arm across their lap. Place your index finger across their biceps tendon and then strike your finger.
- **Supinator (C4/6):** With the patient's arm still relaxed across their lap, place your index and middle finger over the brachioradialis tendon and strike your fingers.
- **Triceps (C7):** Hold their ipsilateral wrist with one hand while they let their arm go floppy. Strike their triceps tendon with the tendon hammer.

Co-ordination

- **Finger-nose test:** ask the patient to hold their pointed index finger straight forwards. Now position your index finger tip touching theirs and ask them to alternate between touching the tip of their nose and your finger tip as fast as they can. Repeat on the other side (**intention tremor and past-pointing i.e. 'dysmetria' = cerebellar lesion**).
- **Dysdiadokinesia:** ask the patient to hold one palm up and repeatedly hit the fingers of their contralateral hand onto the palm. Next ask them to alternate hitting the palm with the top and bottom side of their fingers (**impaired co-ordination i.e. 'dysdiadokinesia' = cerebellar lesion**).

Sensation

For pain and light touch, show the patient how each should feel on their sternum first. Depending on the pathology you found in the motor part of the examination, you should focus this part of the exam and start by either testing from distal to proximal in 3 lines (if you are expecting to find glove and stocking sensory loss or a sensory level) or testing dermatomes ± peripheral nerves (if you are suspecting nerve/nerve root pathology)

- **Pain (spinothalamic):** use neurological pin
"Close your eyes and every time you feel it say 'sharp' if it feels sharp like it did on your sternum or 'blunt' if it feels blunt"
- **Light touch (dorsal column):** use cotton wool bud
"Close your eyes and every time you feel it say 'yes'"

For the modalities below, start distally and only work up proximally if cannot feel it...

- **Proprioception (dorsal column):** hold the proximal phalanx of thumb with your index finger above and your thumb below. Use your other hand's index finger and thumb to hold each side of the distal phalanx. Show the patient the up and down position. Now get them to close their eyes and repeatedly wiggle it up and down. Stop in one position and ask them if it is up for down. Do it 3 times. If they get it wrong, move to the metacarpophalangeal joint, then wrist and so on until they can correctly state the position.
- **Vibration (dorsal column):** twang the long prongs of a 128Hz (long) tuning fork. Place the round base on their sternum to demonstrate what it will feel like. Now hold it over their interphalangeal joint of their thumb. Ask if they can feel it vibrate and then get them to tell you when it stops vibrating (hold the prongs to stop the vibration). If they cannot sense vibration, move to the metacarpophalangeal joint, radial styloid and so on until they can feel the vibration.
- **Temperature (spinothalamic):** use the long prongs of the tuning fork and see if the patient can identify them as cold on their sternum. If so, hold a prong horizontally over the skin on the dorsum of the hand and see if the patient can feel it as cold. Move proximally up the arm until they can feel it as cold.



To complete

- Thank patient and cover them
- "To complete my exam, I would examine the cranial nerves and also do a lower limb neurological examination"
- Summarise and suggest further investigations

<u>UMN Lesion</u>	<u>LMN lesion</u>
Increased tone	Wasting and fasciculation
Spasticity	Decreased tone
Weakness	Weakness
Brisk reflexes, extensor plantar response	Reduced reflexes